Human Body Systems and Disease

7-3 The student will demonstrate an understanding of the functions and interconnections of the major human body systems, including the breakdown in structure or function that disease causes. (Life Science).

7.3.2 **Recall the major organs of the human body and their functions within their particular body system.**
Taxonomy level: 1.2-A, B Remember Factual and Conceptual Knowledge

Previous/Future knowledge: In kindergarten (K-3.2), students identified the functions of the sensory organs (including eyes, nose, ears, tongue, and skin). In 4th grade (4-2.3), students explained how humans use their sensory organs. This is the first time in science that students have been introduced to the human body and its functions. Students will *not* develop this concept further in high school biology because the focus will be at the cellular level.

It is essential for students to know that the human body consists of major organs that have specific functions required by the body to perform its life functions. Examples of major organs and their functions in the body are:

System	*Major Organs*	*Function (s)*
Circulatory	Heart	Causes blood to flow through the body by its pumping action
	Blood vessels (arteries, capillaries and veins)	• Tubes that carry blood throughout the entire body. • Most arteries carry blood that has oxygen and nutrients to all the parts of the body. • Most veins carry waste products (for example carbon dioxide) from all the parts of the body back to the heart. • *Capillaries* are very small vessels where oxygen and nutrients leave the blood to go into the cells and carbon dioxide and other waste products enter the blood from the cells. • *Blood* is composed of red blood cells, white blood cells, platelets, and plasma that have different functions.
Respiratory	Nose	Collects air from the environment and moistens and heats the air before it enters the trachea
	Trachea	The windpipe; moves air from the nose to the lungs
	Bronchi (sg., bronchus)	Tubes that move air from the trachea to the lungs; one bronchus leads to each lung; part of each bronchus is outside the lung and part is inside.
	Lungs	The main organs where gases are exchanged between air and the blood; the *alveoli* in the lungs are where the gas exchange takes place.
	Diaphragm	The muscle that aids in the breathing process

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Digestive	Mouth	Begins to break down food into smaller pieces through *mechanical digestion*; saliva in the mouth starts the process of *chemical digestion*
	Esophagus	The transport tube that carries chewed food to the stomach
	Stomach	Continues the process of mechanical digestion; and secretes gastric juices that continue the process of chemical digestion started in the mouth
	Small intestines	The organ where most of the chemical digestion of food takes place; nutrients from food are also absorbed through the small intestines
	Large intestines	The organ where water is absorbed from the food and taken into the bloodstream; prepares the remaining undigested food for elimination from the body
	Rectum and anus	The rectum is a short tube that stores solid waste until it is eliminated from the body through the anus.
Digestive	Liver	A secondary organ of the digestive system that produces bile, which is used by the body to break up fat particles.
	Gallbladder	A secondary organ to the digestive system that functions to store bile produced by the liver.
	Pancreas	A secondary organ to the digestive system that functions to produce digestive juices that help to further break down the food in the small intestine.
Excretory (Urinary)	Kidneys	The two kidneys get rid of *urea*, excess water, and some other waste materials released by the cells. These are eliminated as *urine.*
	Ureters	Tubes which connect each kidney to the bladder
	Bladder	A saclike muscular organ which stores urine until it is released from the body
	Urethra	Tube through which urine passes before it is removed from the body

Nervous	Brain	An organ of the central nervous system, which has three distinct parts that all serve to control and coordinate the activities of the body. • The *cerebrum* controls thoughts, voluntary actions, and the sensations related to the five senses. • The *cerebellum* helps with balance and coordination. • The *brain stem* is located at the base of the brain and controls vital and involuntary processes (for example, breathing, the beating of the heart, and digestion).
	Spinal cord	A bundle of nerves that begins at the brain stem and continues down the center of the back through the vertebrae. It connects with the peripheral nerves.
	Peripheral nerves	A network of nerves that branch out from the spinal cord and connect to the rest of the body and transmit signals to and from the brain through the spinal cord.
Muscular	Skeletal muscles	Voluntary muscles attached to bones and provide the force needed to move the bones; *tendons* connect the skeletal muscles to bones
	Smooth muscles	Involuntary muscles that control many types of movement within the body (such as digestion)
	Cardiac muscles	Involuntary muscle that forms the heart
Skeletal	Bones	Provide shape and support for the body and protection for many organs and structures; some bones produce blood cells; some store minerals • *Joints* occur where two or more bones meet • *Ligaments* attach bones at the joints
Integumentary	Skin	Covers the body and prevents the loss of water; it protects the body from infection and injury; it helps to regulate body temperature, get rid of wastes (sweat), receive information from the environment and produce vitamin D.

It is not essential for students to know the major organs of the reproductive system, immune system, endocrine system. The reproductive system will be studied in the health curriculum. Students do not need to know the pathway of blood through the circulatory system, the chemical processes (including names of enzymes) that occur during digestion, or name the bones of the body.

Assessment Guidelines:
The objective of this indicator is to *recall* the major organs of the human body and their function within their particular body system; therefore, the primary focus of assessment should be to

remember information about the different organs and their major functions. However, appropriate assessments should also require student to *identify* the system that each organ belongs to; *recognize* an organ from words, pictures, or diagrams; or *identify* an organ based on the description of its function.